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ABSTRACT

One of the great paradoxes of our time is that while the population explosion indicates health services are effective in curing disease and maintaining life, a shortage of physicians to further cure illnesses and maintain life is in evidence. One of the major problems involved in this lack of physician manpower is that of a shortage of medical teachers. This problem is evident in developed nations, but is even more pronounced in underdeveloped or developing nations. Fortunately, international exchange of medical teachers and cooperation in teacher training has permitted progress that few nations could have achieved by themselves. This document addresses the question of the training of medical teachers with special regard to the needs of developing countries. It is recommended that the World Health Organization take positive steps to create international centers to train medical teachers, both at stationary points and in travelling seminars. (HS)

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WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES No. 337

The Training and Preparation of Teachers for Medical Schools with Special Regard to the Needs of Developing Countries

Fifteenth Report of the WHO Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel

This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization.

GENEVA
1966

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WORLD HEALTH ORGANIZATION
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No. 337

THE TRAINING AND PREPARATION OF TEACHERS FOR MEDICAL SCHOOLS WITH SPECIAL REGARD TO THE NEEDS OF DEVELOPING COUNTRIES

Fifteenth Report of the WHO Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel

WORLD HEALTH ORGANIZATION
GENEVA
1966

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Geneva, 30 November - 6 December 1965

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Fifteenth Report of the WHO Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel

The WHO Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel met in Geneva from 30 November to 6 December 1965.

Professor M. L. Rosenheim was elected Chairman; Dr A. Hurtado, Vice-Chairman; and Dr B.L. Taneja and Dr C. E. Taylor, Rapporteurs.

The task of the Committee was " to review methods for the effective preparation of teaching staff and to recommend international measures to promote such action as may be necessary ".[1] In opening the meeting, Dr M. G. Candau, Director-General, invited an exchange of views and experience on the training and preparation of teachers for medical schools, with special regard to the urgent and increasing demands of the developing countries. He drew attention to the world-wide shortage of suitable teachers, particularly in the fields of basic medical sciences and preventive and social medicine. This shortage is felt acutely in the developing countries. The urgency of this problem was evident, since the lack of adequate teachers constitutes the main obstacle to establishing the new medical schools that are needed, especially in the emerging and developing countries. Since the problem is qualitative as well as quantitative, the Expert Committee was invited not only to suggest ways and means of providing an increased number of teachers, but also to underline, in the training of medical teachers, the fundamental requirements that are common to the needs of all nations.

1. INTRODUCTION

For the first time in recorded history, it is today possible to reduce the ravages of crippling disease by a systematic application of biomedical science to the health problems of the world community. To varying

[1] *Off. Rec. Wld Hlth Org.*, **130**, 42.

degrees, this opportunity has been grasped by every nation, but paradoxically, rapid increase in population, which is a major mark of success in public health, now threatens the adequacy of the health care available to citizens in advanced and developing nations alike. Without significant increment in the production of physicians and other health workers in the coming years, it is unlikely that the people of the world will achieve that degree of freedom from disease that optimal care could now provide for them. Since this situation demands increased efficiency and effectiveness of health science education, it is particularly fitting that WHO should, at this juncture, address itself to the question of how medical teachers should be prepared to face the critical task that is theirs.

The nature and conditions of the evolution of medical science provide a useful perspective from which to view this task. Although the spirit of objective inquiry, which is the base upon which scientific advancement in medical practice is built, stretches back at least to the time of Hippocrates, practice itself was largely empirical, often more witchcraft than science, until the eighteenth century. With the maturation of the anatomical disciplines and the emergence of experimental pathology in the nineteenth century, followed by the elaboration of physiology and pharmacology in the present century, an increasingly sound scientific basis for medical education was created. These developments are changing the nature of the medical faculties. Increasingly, the practitioner of medicine interested in teaching the fundamental disciplines is being replaced by a scientist, not necessarily medically qualified, who devotes his full time to the pursuit of his subject. With the passing years, the instruction offered by these teachers has come more and more to resemble that of science teachers at the universities and has shown less and less relationship to the teaching in the clinical departments. It is only quite recently that the demonstrated benefits of scientific inquiry have led to any substantial support of medical research in clinical departments but, as research has increased during the last two decades, there has been a significant change in the nature of clinical faculties as well as in their value systems. Academic rewards and prestige in medical schools, which formerly went most often to the outstanding practitioner, today go more regularly to the productive investigator.

The increasing sophistication of research workers and their tools and the explosive increase in the knowledge of man's structure and function which they have produced have led inexorably to the fractionation of biomedical sciences into smaller and smaller disciplines and subdisciplines, even as the foci of their studies have shifted steadily to smaller and smaller units, subcellular and molecular. While this evolution has had a profound effect upon the organization and operation of medical schools, it has had an equally profound effect on society. The infectious and nutritional diseases, which once destroyed so many men before they

reached maturity, have responded so dramatically to measures for their management that degenerative disorders and the psychosocial consequences of the changes in world population have become more and more important as public health problems. The increasing sophistication of society about health affairs has also had its effect upon medical education. There is a steadily mounting expectation for more and better health services to be provided through the education of an increasing number of health workers, often of a different kind from those that present patterns produce. As a result, there is growing pressure upon medical schools to modify their research and educational preoccupation with disease and its molecular manifestations towards increasing interest in health and the way it can be best promoted in the molecular aggregates that constitute whole men and their social groupings, whether in developed or developing nations. In both groups of nations, a substantial expansion of educational facilities and resources will be required if these expectations are to be fulfilled, but the provision of facilities and resources will be an empty gesture unless the number of teachers is also expanded. It is fortunate that the latter problem need no longer be solved by each nation acting alone. International exchange of medical teachers and co-operation in teacher training has permitted progress that few nations could have achieved by themselves.

It is in the context of these always complicated, sometimes conflicting, social and professional forces that this Expert Committee has attempted to consider the question of the training of medical teachers with special regard to the needs of developing countries.

The Committee took note of the activities of WHO in the area of medical education, including reports of WHO educational meetings and various studies.[1]

From these reports and other information available, it was evident that the training and preparation of teachers represent a serious problem in many countries, particularly the developing ones, and also represent an important area of international co-operation.

The Committee also noted that WHO has been promoting the preparation of teachers through a number of its activities. These include fellowships (of which, in 1964, for instance, 17% were awarded to personnel of teaching institutions); organization of special courses, such as those for teachers of genetics in Europe; promotion of special courses, such as the course for the preparation of teachers of preventive medicine held in one of the universities of the Americas; the establishment of special fellowships

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1961, **209**; *Wld Hlth Org. techn. Rep. Ser.*, 1962, **239**; *Report on the WHO Inter-Regional Conference on the Establishment of Basic Principles for Medical Education in the Developing Countries, Geneva, 7-11 Sept. 1964* (Unpublished WHO document PA/25.65); *Preparation of the physician for general practice*, WHO, Geneva, 1963 (*Publ. Hlth Pap.*, No. 20); *Off. Rec. Wld Hlth Org.* No. 127, pp. 182-194 (extracts).

to assign candidate teachers as supernumerary staff to existing departments; and the holding of educational meetings that have provided some guidance also on the preparation of teachers. Further, WHO has promoted schemes of affiliation between older and younger medical schools and has also assigned many visiting professors to the new medical schools of developing countries. One of the main responsibilities of these visiting professors, either as individuals or as team members, has been the preparation of their successors from among the national staff.

2. IMPORTANCE OF MODERN EDUCATIONAL METHODS

Little use has so far been made of the emerging science of education in the training of medical teachers, and this new science must be exploited fully in planning future programmes of medical teacher training in developed and developing nations alike. The incorporation of such concepts as those described below is of great importance.

2.1 The learning process

Since the only justification for teaching is the encouragement of learning, it is not illogical to suggest that those who teach should become reasonably familiar with what is presently known of the learning process, so that their instructional efforts should facilitate, and not inadvertently impede, what their students must do. While it is true that, as in any dynamic field of inquiry, controversy exists among the psychologists who are investigating learning, there are certain broad areas of agreement, some of which might be noted here along with their implications for medical teaching.

One of the fundamental principles is that learning is an individual matter, done by the learner and not achieved through some magical transmission from the teacher. Different students learn in different ways, using different means, and a teacher need not consider himself the primary source of their knowledge but must consciously encourage independent learning.

A second fundamental principle may seem too obvious to need statement, but the frequency with which it is overlooked suggests that familiarity is not necessarily followed by appropriate action. This principle, stated in its simplest form, is that learning will be more efficient and more effective if teachers and students alike are clear about what they are trying to do. The definition of educational objectives is rarely easy, but is essential if learning is to be direct and focused, rather than accidental and amorphous. A substantial amount of the time that a teacher spends

with his students can be used most effectively in helping them to define clearly how they should be changed at the conclusion of a period of study, and not merely in describing the nature of the experiences through which they will pass.

A third key to efficient learning is motivation, about which there is often more talk than understanding among faculty members. Teachers frequently express the belief that they must motivate students (often, apparently, to become what they themselves are) when in fact the critical task is to identify and exploit whatever motivation the student may already possess. The clearest inference to be drawn from this principle is that medical teaching should be regularly and overtly relevant to the goal toward which most students are striving; namely, that of becoming physicians. It should not appear, as so often it does, to be no more than a hurdle which must be taken in order to survive academically.

A further concept is that of " feedback ". It is very clear that learning can be made both more efficient and more effective if students can determine with some regularity, and without fear or threat, what they have learned and what they have yet to learn. The practical implication of this principle for a teacher is very clear : he must somehow create a setting in which frequent individual assessment of student progress may be accomplished without the element of faculty judgement getting in the way of a student's freedom to exhibit his ignorance in order to learn.

2.2 Instructional methodology

If learning is the objective of education, a teacher's sound and perceptive employment of the methods and tools of instruction is the means by which it can be made more efficient. His task here is twofold : wise selection and skilful use. The problem of selection not only necessitates familiarity with the vast array of instructional materials and methods (lectures, conferences, seminars, clinics, laboratory, books, films, slides, models, progammed texts, journals, etc.) but also entails identifying which of them will most adequately serve the instructional objective he has defined. Although the strengths and weaknesses of most of these means of instruction are very well known to professional educators, the habitual and almost stereotyped use in medical education of only a very few of them for a great variety of instructional goals suggests that medical teachers could profit from a more systematic review of the entire subject of instructional methodology.

Quite independent of familiarity with methods is skill in their use. While instruction in the technique of lecturing, the most widely used form of medical teaching, has been undertaken by an occasional medical school department, the general quality of lectures, as they are described by students from all parts of the world, does not appear to be very high, and there

seems little question that a massive attack on this problem alone might be a major contribution to the improvement of medical education. On the other hand, even the most rudimentary introduction of medical teachers to an understanding of group interaction, which is a key to the successful conduct of a conference or seminar, is virtually unknown ; young teachers without number are expected to conduct laboratory or clinic exercises with no further understanding of how to carry them out successfully than they gained as students. It is surely unwise to continue to depend upon unguided experience as the principal means by which medical faculty members learn to use the tools of their profession.

2.3 Student evaluation

While learning is the objective of teaching, and while the teacher is a major instrument for its facilitation, evaluation provides the final evidence of whether learning has been accomplished and some insight into whether the teacher was effective. Although the advances in the field of evaluation during the last 25 years have been both substantial and significant, the tools of evaluation that are most widely used in most parts of the world were already old a century ago. Medical teachers can no longer fulfil their educational responsibilities adequately without more knowledge than most now have of the criteria by which they can select, from the increasingly varied array of evaluation tools, those that will provide the most valid and reliable data on the kind of behaviour they are attempting to assess. In addition, the teachers need help in acquiring the skill that will allow them to design new test procedures or vary old ones and the understanding that will allow them to score accurately, interpret perceptively, report meaningfully and use wisely the information derived from the measurement methods they use.

2.4 Educational sociology

As a final illustration, it should be noted that both intramural and extramural group forces of great variety and complexity have very significant influence upon the nature of learning within any institution. Although some of these forces may be difficult or impossible to change, it is essential that they be understood, or at the very least identified, in order to utilize them productively where possible or modify them for productive use where feasible. Only a few examples will be given here to suggest the nature of these issues.

Within a student body there are always subgroups that represent value systems that may facilitate or impede the achievement of educational objectives (the grade-getters, the patient-care centred, the research-focused). Within the faculty, too, such forces may make themselves felt ; the clin-

ical and basic science groupings are perhaps most commonly cited, but the social forces represented by the dean and the departmental power structure and university administration are often equally important. Outside the university, both governmental ministries and society at large generate forces that may be irresistible. As an illustration, the contemporary "revolution of rising expectations" for health care is surely having an effect on the medical education programmes of developed and developing nations alike.

2.5 Need for action

With solid information, perceptive understanding and professional skill in the employment of learning theory, instructional methodology, evaluation process and educational sociology, the medical teacher should be in a far better position to engage in sound curriculum construction and implementation. To devote long hours to the hard work of shaping a curriculum without this background is often to engage in a major effort for minor rewards, for the structure of a curriculum is no more than a framework. It is what teachers and students do within it that counts.

Preparation of medical teachers is so important that action must be taken promptly by WHO and individual countries and their medical schools as well as other interested agencies. To this end, a series of specific recommendations to WHO and to individual countries and schools have been included in the final section of this report.

3. GENERAL REMARKS ON THE RECRUITMENT AND SELECTION OF TEACHERS

Differences in the educational and cultural backgrounds of countries are so great that it is hazardous to generalize on problems of selection of teachers. The balance between recruitment and selection is largely determined by the relative supply of each category of teacher. Where great shortages exist, emphasis must be on the attraction of the best possible candidates. Where supply is greater, the selection of the best qualified presents an entirely different problem. In general, the areas where deficiency is greatest are in the preclinical sciences, including pathology, pharmacology and microbiology, and in community medicine. Candidates are far more readily available in most clinical fields, though difficulty is often encountered in the recruitment of psychiatrists, anaesthetists, ophthalmologists and other specialists.

Different methods may be used to attract teachers to make up these deficiencies. A good teacher in one of these fields provides the greatest

stimulus to students to enter it, and the arousal of interest will produce far better teachers than will persuasion or financial inducement. In a university at which the staff is all full time, the status of the preclinical teacher is more likely to be rated as high as that of the clinician. Integration of teaching between clinical and preclinical departments will also demonstrate to students the importance and relevance of the nonclinical subjects and is likely to attract some of the keener students. Nonmedically qualified scientists may have to be recruited into some of the preclinical departments, but their interests should largely be orientated towards medical problems.

Selectors of potential teachers should pay due regard to their educational skills, and increasing appreciation of the problems discussed in section 2 of this report should lead to gradual improvement in the standard methods of education. Research into the field of evaluation of selection is urgently required.

At the present time, while selectors can assess the candidate's academic achievements, his professional competence and his declared interests, they must also attempt to judge his teaching abilities, his personal relationship with patients, students and colleagues, and his motivation.

In any medical school, certain students and young graduates will select themselves as future teachers as their interest in teaching, their humanitarian and sympathetic attitudes to their patients, their sense of community responsibility or their interest in research become apparent.

4. PREPARATION OF TEACHERS FOR DEVELOPING COUNTRIES

4.1 Size and urgency of the problem

In the over-all urgency of the world problem, the magnitude of the teacher needs of developing countries is evident. The urgent need for expanding health-care services implies the training of more physicians, both by establishing new medical schools and by expanding the existing ones.

The most crucial problem in the establishment of a medical school is the provision of a suitable teaching cadre. The gap between the demand for and the supply of suitable teachers is becoming wider. Various calculations indicate that there should be at least one medical school for every two to three million population. There are today throughout the world about 800 medical schools,[1] though these, of course, are not evenly

[1] Information found in: World Health Organization (1963) *World Directory of Medical Schools*, 3rd ed., Geneva, WHO, supplemented by the number of new medical schools established since 1960, and by an estimate to cover countries not listed in the directory.

distributed among the world's population. If the suggested figure of at least one medical school for every two to three million population is accepted, then, in order to satisfy even the *present* needs in the world, about 250 to 750 new medical schools are required; allowing only 100 teachers of different academic rank for each school, this implies the provision of 25 000 to 75 000 additional teachers. Since many of the existing schools are understaffed, the range of magnitude of the teacher needs of developing countries is even greater.

In order to illustrate this, one might mention that, in India alone, it is intended to establish 30 new medical schools within the next five years and a further 80 by the end of the century. Another example is that of tropical Africa, where there are but eight medical schools for a population of 210 millions. In most developing and emerging countries governments are eager to establish medical schools, in spite of the difficulties of meeting the heavy cost of medical education and the provision of suitable teachers.

4.2 Specific objectives in medical education in developing countries

The quantitative/qualitative dilemma, so evident in many of the problems of developing countries, is particularly acute in medical education. Most rapidly developing countries have rejected the suggestion that their circumstances may require production of a "lower quality" physician. Health leaders in these countries are increasingly aware of the quantitative implications of their massive health needs and of the necessity for greater use of auxiliary workers in providing preventive and routine curative care. These auxiliaries should be adequately supervised in a framework of regionalized health services, with provision for individual patients to be referred to physicians when necessary. There is increasing agreement that there should be a sufficient gap in qualifications between auxiliaries and physicians to prevent any confusion in themselves or in the public as to the relative roles of the two groups.

Furthermore, it is becoming increasingly accepted that the projected patterns of health care in developing countries require physicians of wider skills than are at present being produced. The distinction is clear ; what is needed is a "different", but not a "lower", quality of medical education. The qualitative aspects of medical education must be recognized as dynamic and changing.

A major difference in objectives between developing and more developed countries can be indicated by the contrast in what is meant by the term "basic physician". Medical educators all over the world claim that they are producing basic physicians. In the more developed countries, this means the "fledgling" physician, or the medical-school graduate who has had a sound foundation of medical education but with minimum

preparation for immediate medical practice and maximum potential for future development. In developing countries, however, the "basic" physician is expected to have sufficient practical experience immediately to meet the commonest health problems of his area.

A second objective is that much greater emphasis must be given to the community, social and preventive responsibilities of these new graduates. Preparation in the basic sciences of community understanding, including epidemiology, biostatistics, preventive medicine, health education, sanitation and community organization is needed, while the behavioural sciences, genetics, and human growth and development, with special stress on psychological factors, must not be neglected. As to clinical training, it is essential that the outlook be broadened beyond the responsibility of doctors for individual patients to include the concept that the whole community is the doctor's patient. If the physician is responsible for a population ranging in number from 7 000 to 70 000, as in most present plans for health services, he must be able to establish priorities based on the total curative and preventive needs of his community. He can serve such large numbers only by using auxiliaries, so that he must not only learn enough about the functions of these auxiliaries, so as be able to supervise their work, but he must also develop the leadership skills needed to produce an effectively functioning team.

Teachers of community medicine should have appropriate field experience in their own region. The rural areas of many developing countries have such urgent needs for medical manpower that increasing numbers of schools provide rural experience in teaching health centres throughout the medical course and internship. Teachers of community medicine in such areas must be familiar with rural health work and conditions so that they can provide the necessary field supervision and orientation for students. If clinical teachers, too, acquire familiarity with the problems of rural communities and undertake to participate in the regular work and research of the teaching health centres, a particularly favourable impact on the student results.

In many instances, the physician in developing countries will have minimal access to some of the more refined laboratory and therapeutic equipment and services so often used in modern medicine. In addition, owing to the scarcity of medical staff, he will often be without the immediate help of competent specialists. Hence, his training should prepare him to rely more on his own knowledge and clinical skill. This requires a proper orientation of medical education and confirms the need for maintaining the high standards already established in many of the newer medical schools.

The great prevalence of communicable diseases, diseases of early childhood, and malnutrition makes it necessary to ensure that future physicians and teachers can not only handle these and other health prob-

lems in individual "cases" but can also understand their cultural and socio-economic background.

Another objective is to develop a thoughtful approach to the problems the physician is likely to encounter in practice. This objective is particularly important in those countries where the whole primary and secondary educational system is based on an educational approach characterized mainly by the rote learning of facts, which results in an obsessive belief in the validity of the written word. In such circumstances, students value most highly the teaching that gives them the largest volume of notes that can be memorized. This tendency is sometimes accentuated by the basic lack of educational materials ; if the student has only one textbook and a set of lecture notes available, he will tend to try to memorize this material in order to pass examination hurdles rather than attempt to understand the basic process concerned. One of the greatest blocks to innovation in medical education is the resistance of medical students to the essentially traumatic process of being made to think their way through problems.

4.3 Teaching staff for a new medical school

When the decision is taken to start a new medical school in a developing country, the recruitment of the teaching staff, especially for the preclinical subjects, usually presents the most formidable problem. The following is an outline of certain principles that may prove helpful.

(*a*) It is essential to concentrate from the outset on planning for the orderly preparation of teachers who are nationals. As early as possible, the best available persons for such preparation should be selected, their course of training settled, and their future assured.

(*b*) It is desirable that the dean who is going to organize the medical school should be a national with appropriate professional and official standing in his own country.

(*c*) Some medical schools in developing countries, anticipating the need for teachers in projected new medical schools, have undertaken to train more medical teachers than they themselves require. This is an approach that should be encouraged, that often requires financial support, and that could be amplified by suitable joint planning with health and educational authorities on a regional basis.

(*d*) Teachers from other countries are often needed temporarily to fill faculty vacancies. Certain obvious advantages arise from employing teachers from neighbouring countries. The more elaborate exchange arrangements and special affiliations between schools in developing and more advanced countries will be discussed below in section 4.7.

The Committee considered a number of possibilities for overcoming the special difficulties of starting the basic medical science departments, and several examples were analysed. Although some of them may not fit the needs or aspirations of a given country or medical school, it was felt that they were worth recording for the benefit of at least some of those medical schools that might make use of them as temporary measures in specially urgent situations.

4.3.1 *A "descending" pattern for medical school development* was the experience of some new schools, including the Hadassah Medical School of the Hebrew University in Jerusalem. This plan permits the starting of clinical teaching in situations where either the shortage of preclinical teaching staff is most restricting or where physical facilities for basic medical science laboratories are not yet available. This plan is essentially the converse of the two-year medical college, which teaches only preclinical sciences. Using existing clinical facilities and staff, students are admitted only for their clinical training ; they get their pre-clinical preparation elsewhere until appropriate departments can be developed. However, arrangements for opening these departments and for training adequate staff must be organized before starting such a short-term scheme.

The five great advantages of this scheme are : (*a*) that the clinical conditions that the students see are those of their own country ; (*b*) that it shortens the student's stay abroad to a half of the long period of the medical curriculum ; (*c*) that it brings into the local hospital a group of young students, creating there an incentive not only for teaching in clinical medicine but also for creating adequate facilities and staff in "paraclinical" subjects (clinical chemistry, microbiology, pathology, etc.) ; (*d*) that it creates academic pressure to establish more quickly the infrastructure of the preclinical disciplines (anatomy, physiology, biochemistry, pharmacology, etc.) ; and (*e*) that it does not require an immediate large investment of capital.

4.3.2 *Use of highly qualified clinical staff for teaching preclinical disciplines.* Under some specific conditions and where a highly qualified clinical staff rooted in basic medical sciences is available, good use may be made of its capacities to take over, completely or partially, the teaching of preclinical disciplines. Pathologists and surgeons could teach histology and anatomy. Clinical microbiologists could teach bacteriology, parasitology or virology. Haematologists, cardiologists, gastro-enterologists and endocrinologists could teach the basic core of physiology and biochemistry. This scheme does not, of course, imply perpetuation in a given medical school. It may, however, be considered as a *modus operandi* in an emergency situation, and as such permits greater flexibility in developing new medical schools.

Incidentally, such an arrangement might also provide a concept and experimental challenge for both developing and developed countries and could meet the need for increasing integration of teaching and for the confluence of preclinical sciences in application to clinical training.

4.3.3 *Use of nonmedically qualified scientists for teaching preclinical subjects.* The appointment of nonmedical scientists in the nonclinical departments helps not only to meet the shortage of qualified medical teachers but also to promote research in these subjects. It is necessary that such teachers should have a medical bias and orientation. The best solution to meet the needs of the situation is probably to have mixed departments with both medical and nonmedical teachers.

4.4 Recruitment and selection of potential teachers for developing countries

The general principles outlined in section 2, above, must be made more specific and definite in terms of the needs of developing countries. Attraction into clinical subjects presents little difficulty and requires little stimulation. On the other hand, the great unmet need for teachers of basic sciences and community medicine still requires the use of special inducements. It is in these fields that international co-operation has played and should continue to play its greatest role. Fellowship programmes, exchange of teachers, and special courses should be expanded to meet the need for the high quality of teacher needed for these special subjects. In all academic fields, only those teachers with a solid grasp of the fundamentals of their subject will be able to decide what reasonably can be omitted and what will be most useful for the student. Particularly in the field of community and social medicine, a high level of competence is necessary, since the teacher must adapt what has been learned elsewhere and must develop an appreciation and understanding of the local situation.

Some basic points concerning the selection of teacher trainees can now be outlined :

4.4.1 *The early selection of the young teacher.* This is largely a stage at which self-selection operates; because of spontaneous academic interest, performance and recognition of worth by senior teachers, certain students are picked out as having faculty potential. The individual senior teacher is therefore the primary selecting mechanism for this pool of potential teachers.

During their undergraduate education, those medical students who will become teachers assimilate many of the basic points of view and methods that subsequently will become evident in their own teaching. The influence of both bad and good teachers can thus permeate several generations.

Some medical institutions provide opportunity for advanced work in basic subjects, such as anatomy, physiology, pathology, pharmacology and microbiology. Students showing aptitude in a subject may be encouraged to interrupt their medical studies and to undertake a year or more of special work, some of them going on to take higher degrees. Fellowships should be provided for such experience. These individuals should be absorbed as teachers during or immediately after completing their special training and during their further medical course.

4.4.2 *Recruitment of teachers half-way up the academic ladder.* At this level, self-selection is less important, and other mechanisms become operative, as follows :

(*a*) A group of professional peers should now be involved, and selection should not be performed either by the department head alone or by a board of lay administrators.

(*b*) Academic promotion at each level should not depend on detailed formulae specifying itemized requirements. General standards should be set, but provision must be made for the recognition of outstanding individuals with unorthodox backgrounds.

(*c*) Similarly, rigid time requirements at each level of preparation should not prove restrictive. Although general statements to ensure appropriate maturity and experience are desirable, there should be provision for the more rapid advancement of particularly capable individuals.

(*d*) Particular criteria in selection of the teacher have been discussed at some length elsewhere in this report. They are repeated here in summary form only : (i) basic knowledge and skills in his area of professional competence ; (ii) teaching skills and understanding ; (iii) attitudes and relationships with students and professional colleagues ; and (iv) experience and ability in research or in promotion of research.

4.5 Postgraduate education of potential teachers

The postgraduate training of potential teachers should be carried out, to the fullest extent possible, in their own countries and against the background of their own cultural and social environments. While the staff of any teaching hospital should be able to organize postgraduate clinical training, it is imperative that such institutions should provide for regular clinico-pathological conferences, " grand rounds " and journal clubs (i.e., circulation of journals, evaluation and discussion of relevant articles among members), and that there should be an efficient system of maintaining clinical records. Conference and seminar rooms and an effective library service must be available. For postgraduate training of candidates in basic medical sciences and community medicine, additional facilities will be required, and departments undertaking such

training should be well equipped with laboratory or field facilities. During this period, attention should be paid to instruction and teaching methods and processes, and these selected postgraduate students should conduct seminars and other teaching exercises.

Countries vary greatly in the extent to which they need to send their potential teachers abroad for postgraduate training. Those postgraduate students who will be sent abroad for advanced training on national or international fellowships should be selected with regard to the educational priorities that have been discussed. In their training abroad, special care should be taken to distinguish these selected postgraduates from the large number of young doctors who are engaged in study and clinical work at their own expense and initiative. Wherever possible, their experience should be concentrated on subjects and areas of research that have relevance to the candidates' home conditions. The deans and the medical faculties of the schools at which these postgraduate students are expected to teach should participate in their selection.

It has been repeatedly demonstrated that, before selected candidates are sent for overseas training, suitable posts in teaching institutions should be available for them on their return. There is no greater frustration for a fellowship holder than to come back to his own institution only to find that there is no appropriate position for him to fill nor any facilities with which he can work. Many such graduates return to the foreign countries in which they received their training and there find their future careers. Various means for preventing such permanent emigration of qualified teachers have been developed. In India, for example, a pool has been established in order to centralize the assignment of returning graduates to appropriate medical colleges and research institutes. On a temporary basis, support can be given through such mechanisms until regular posts become available.

In addition to the fellowships for international training that have been mentioned, there is also great need for international assistance in the establishment of postgraduate training centres in the developing countries. Such centres need both specialist staff and expensive equipment from abroad. The specialist staff may in due course be replaced by specially trained nationals ; the equipment will continue to require expert maintenance and occasional replacement. Such a postgraduate institute might well house a special unit for the study of educational problems and methods.

4.6 Continuing education of the trained teacher

Opportunities should be arranged for teachers, once they are fully trained, to keep abreast of recent developments in medical sciences and educational processes. Suggested measures include travelling fellow-

ships within and outside their own countries and participation in seminars and conferences to exchange views and to establish personal contacts with national and international workers. Health ministries, research organizations and other professional bodies should arrange workshops in methods of research, patient care and medical education.

It is of the utmost importance that regular or sabbatical leave be given to teachers for sufficient periods to enable them to devote full time to work of their own choice. This time should not be spent primarily on obtaining higher degrees. During this period they should be given full pay and travelling and other allowances, and their relative seniority in service should be safeguarded.

4.7 The use of foreign teachers and special affiliations between medical schools

Experience has accumulated in many different situations on the conditions under which medical teachers from the more developed countries can be most effectively used in developing countries. Particularly in the early stages of development of a new medical school, it is often necessary to employ teachers from abroad. As indicated throughout this report, the need for such persons is usually greatest in the basic sciences and community medicine. In most instances, a long-term appointment is desirable so as to permit the foreign teacher to become familiar with local conditions.

It should be clearly understood that a major responsibility of such teachers is to " work themselves out of a job " by preparing local graduates for the teaching posts. Several counterparts should be selected by the local faculty as early as possible and, after a period of association with the visitor, his future successor might be selected and sent elsewhere for further experience. Mechanisms to ensure overlap and continuity of activities are much needed.

Considerable effort has gone into various arrangements for developing affiliations between schools in the developing and more developed countries. While there have been some substantially successful relationships that have yielded great mutual profit to teachers from both schools, there have been many disappointments. A single school may, on occasion, be unable to provide all the staff required, and several schools may need to co-operate in the venture, with one school accepting primary responsibility. It is necessary that one senior teacher who has been through the exchange programme and continues to be actively interested in it should be made responsible for administration and recruitment. Although it may be necessary for the institution from the more developed country to recruit people from other schools, these recruits should be of the same calibre as the regular teachers. The exchange should be a real one, teachers

moving both from the developed to the developing country and vice versa in a planned sequence designed to provide teachers from both countries with the maximum educational benefit. The status and responsibilities of the visitors must be clearly defined by mutual agreement. The teacher from the more advanced country should devote his time mainly to teaching and should be encouraged to undertake research in co-operation with local staff, but he should be protected from too much routine and administration. Long-term appointments are ordinarily desirable but, when a department is already fairly well established, shorter visits by the most senior faculty member from the more developed school will also have a favourable impact. One should not overlook the fact that some recently retired professors have made notable contributions when given short-term appointments, and such senior teachers represent a potential resource. Younger foreign physicians tend to work most effectively in the wards and on research projects and thereby exert an excellent influence on the junior staff of the school.

5. NEED FOR RESEARCH IN EDUCATIONAL PROCESSES

The magnitude and urgency of the world-wide problem of medical teacher training is such that it appears essential to conclude the body of this report with remarks upon the desirability, indeed the necessity, for research into the educational process in medicine as a means of providing more substantial data upon which to build even better programmes of teacher training than have yet been envisaged. If this goal is to be accomplished, then it is inescapable that some of the teachers being trained for future responsibilities in medical schools must become skilled in using the methods of educational research. Having acquired this competence, they will be able to address themselves to problems on which evidence drawn from the medical education, rather than elementary and secondary education, is very much needed. Nor need they be diffident about engaging in relatively simple descriptive studies rather than more complex and difficult testing of hypotheses. Indeed, the need for objective information about what really takes place between teachers and students in contrast to idealized accounts or distorted descriptions, provides subject matter for the many rewarding research endeavors that will be required before realistic hypotheses about the learning process at high levels can be identified for investigation.

5.1 Studies of educational methods

A great deal of contemporary medical education is carried out within a curricular structure and using instructional methods that are reminiscent of an earlier century. In some quarters, there is scorn for the well-estab-

lished lecture as a useful device, and in others there is disdain for the presumably more modern seminar and conference. Nevertheless, neither proponents nor opponents of these devices can point to any substantial body of data from medical education that supports their views; they are rather inclined to generalize from personal experience or to express individual preferences. It is unlikely that any sound or generalizeable conclusions can be reached until trained teacher-investigators, sufficiently knowledgeable to identify and control extraneous variables, are available. They will then be able to clarify the behavioural objectives of their instructional efforts and to select or create the measurement methods that are likely to provide the needed evidence on the extent to which the desired outcome is achieved. In passing, it might be noted that, as in the case of laboratory research, the mere process of conducting a study is informative and revealing, whatever the outcome. As a means of extending the intramural training of teachers, the introduction of educational research can be invaluable.

If established instructional methods can profitably be subjected to critical scrutiny, it is equally important to document the real utility of promising new aids to instruction. There is some reason to believe, for example, that programme instruction and teaching machines may prove valuable in developing nations to facilitate the achievement of some informational objectives in the medical course of study. Similarly, for those countries with the necessary resources, closed-circuit television may be able to enlarge the number of students that a master teacher might reach or, in effect, to bring many students, as a group, to instructional settings where otherwise only one or two might go. The computer, as an informational storage and retrieval device for students seeking many kinds of information and as a simulator of clinical and laboratory problems that individual students can probe on a much-compressed time-scale may also prove useful.

However, each of these requires reality testing, a dispassionate assessment of its worth. It is only the unwary or the unsophisticated who will accept on faith claims that are based on little more than uncontrolled experience. No method of instruction, no teaching aid is good in and of itself.

More systematic investigations of the actual value of instructional techniques and devices in medical schools are badly needed, especially in those parts of the world where teachers are in short supply and their productivity must be increased.

5.2 Studies of teacher effectiveness

Equally important are efforts to study the effectiveness of individual teachers, and coincidentally the ultimate utility of medical teacher train-

ing programmes of various kinds. If the nature of the educational process described in section 2 of this report is valid, then it should be possible to undertake a preliminary assessment of the relative usefulness of knowledge of the nature of learning, of teaching and of evaluation, and of skilful use of the materials and methods of instruction in affecting the student product.

Despite persuasive evidence from other sectors of the educational field, the possibility must be entertained that these matters are essentially irrelevant in the setting of medical education. If they are to be dismissed, however, it should be done on the basis of data accumulated objectively and systematically, rather than as a result of generalizations generated from essentially personal experience with sampling bias. Even if principles well-established from elsewhere are not sustained by such study (which seems unlikely), it is virtually certain that important additional information about education in medicine will be uncovered.

5.3 Studies of educational institutions

The usefulness of operational research, which in this context might best be described as institutional self-study, is by now well-known, yet members of medical faculties often appear to know very little about how the over-all educational programme really functions in their own schools or of the input and output measures by which the effectiveness of their efforts might be judged. The Association of American Medical Colleges, in attempting to deal with this problem, has had a considerable success in aiding several schools to strengthen their educational activities by assisting in a year-long self-study, culminating in a week-long faculty seminar on medical teaching. The information generally derived in such studies has included assessment of the intellectual and non-intellectual qualities of students, critical scrutiny of the nature of the curricular organization and the learning experiences to which students are exposed, objective documentation of student and faculty perceptions of institutional strengths and weaknesses, gross determination of how students and faculty spend their time, analysis of the means by which student progress is judged and the reliability and validity of the methods employed, examination of the relationships between students and faculty and the influence of organization and financing upon the important matter of institutional morale, description of the procedures of the educational decision-making bodies, including the extent to which they are responsive to the need for educational experimentation, and determination of the career-choice patterns of graduates.

Any one of these items studied alone might provide interesting information, but it is when they are considered together, in the context of the over-all institutional programme, that inter-relationships, currents

and counter-currents, and the effects of separate parts upon the whole can be identified and dealt with. For example, one common outcome of such study has been the accumulation of clear evidence that, in spite of a high-quality faculty and student body, with generous facilities and support and reasonable administrative organization and curricular structure, the educational outcome was satisfying neither to students nor to faculty, because a rigid or traditional examination system made it virtually obligatory for students to focus their attention almost entirely upon the rote accumulation of a vast body of irrelevant information.

5.4 Opportunities for action

Such findings can be powerful stimuli to institutional change, particularly when used by faculty members whose training in the educational process has already alerted them to the ways in which educational innovation can be accomplished with the largest measure of faculty enthusiasm and the smallest measure of faculty hostility. Such innovation, based upon carefully gathered information and developed on sound educational principles, may allow some of the medical institutions in developing countries to explore very non-traditional means of preparing physicians and other health workers for the professional tasks they must undertake. Without the encrusted educational tradition that long adherence to a single system creates, the opportunity for visionary experimentation is far greater.

If such studies are to be accomplished, however, new means of support for such research will be required, and in substantially larger amounts than can now be anticipated.

It is because educational research in medicine provides such a fruitful setting for medical teacher-training over the long term that a set of specific recommendations has been included in the final section of the present report.

6. SUMMARY AND RECOMMENDATIONS

This report sets out the present ideas of an international group of experts on the problems of the selection and training of teachers for medical schools, with special regard to the needs of developing countries.

In the introduction, attention is drawn to the problems raised by the rapid increase of sophistication and specialization in medical research, with the resulting fractionation of the biomedical sciences. The increasing demand for comprehensive health services in both the developed and the

developing countries has drawn attention forcibly to the need for physicians trained in the wider concepts of community health.

In the second section, the importance of modern educational processes is stressed. It is pointed out that the rapidly growing understanding of some of the processes of teaching and of learning and of the specific roles of various educational tools has, so far, scarcely been applied to medical education.

The third section reviews some of the problems of the recruitment and selection of teachers that are relevant to all countries and draws attention to the need for research into the evaluation of methods of teacher selection.

In the fourth section, the particular problems of the preparation of teachers for the developing countries are discussed. The size and urgency of the problem are first delineated, and it is suggested that, in order to provide reasonable basic medical care for the world population at the present time, 250 to 750 new medical schools, requiring a cadre of 25 000-75 000 teachers, would be required.

Certain essential differences between the objectives of medical education in the developing countries, as compared with the more developed ones, are next considered. Medical education must always aim to produce physicians of high over-all quality, but certain aspects of their training are of special importance for physicians who are to practise in the developing countries, and these differences are stressed.

The difficulties of starting a new medical school in a developing country are next considered, the major problem being the recuitment of adequate staff, especially for the preclinical, paraclinical and community medicine departments. Some specific proposals are put forward, and some methods that have proved their worth in overcoming these difficulties in recruitment are outlined.

The present report next deals with the specific problems of the attraction of both undergraduates and graduate students and their selection as potential teachers in the newer medical schools. The special attention that should be devoted to the postgraduate training of teachers is then considered. As much as possible of their training should be carried out in their own countries. The problems of selecting graduates for training abroad and the need for prior arrangement of posts to which they will return at the end of their training are stressed. The danger of emigration when such trained personnel become frustrated on returning to their own countries also has been stressed.

Attention is then drawn to the need for continuing education of the fully trained teachers, who require both local and overseas leave without loss of salary or seniority. The next section briefly reviews some of the problems raised by the affiliation between medical schools in the developing and developed countries and by the assignment of teachers from

abroad, including, in some circumstances, retired professors. The value of planned two-way exchanges in the development of new departments is emphasized.

In the final section, the potentialities of educational research in medicine as a means of training teachers, as well as a method of improving educational programmes, are outlined.

In addition to the more general suggestions that appear throughout this report, the Committee made the five following specific recommendations :

1. The WHO fellowship programme should be used to provide special opportunities for persons already qualified in a basic or clinical discipline to gain additional training in educational science. While most such WHO fellows would devote themselves to the acquisition of practical knowledge and skills, some should be encouraged to become proficient in educational research in medicine.

2. WHO should assist in the establishment of an international centre or centres for training medical teachers in educational science. Such centres should have a staff drawn from biological and educational sciences to mount continuing training activities of several types and of varied duration. They should serve as a professional resource to which educational institutions in medicine may turn for counsel, advice and assistance in the development of their own educational training activities or in the conduct of intensive self-study.

3. The international centre or centres described above should organize travelling seminars to bring expert help in education to individual institutions. Such a seminar might serve as the culminating event after a period of institutional self-study.

4. Individual medical schools be encouraged and assisted by WHO to establish, within the framework of their own organizations, departments or divisions of medical education, staffed by persons qualified to train medical teachers in the strategy and tactics of education as well as to co-ordinate the educational research upon which improved programmes may be built.

5. WHO should encourage, and assist in the support of, educational demonstration programmes in selected medical schools in developing countries that are prepared to explore new means of initiating first-rate medical education and that can be provided with staff who would assist them to engage in continuing investigations of the effectiveness of their programmes, their methods and their teachers.

It is the belief of this Committee that the present situation in respect to the training of medical teachers is so critical that the five proposals given above deserve prompt consideration and early implementation.

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